

PATENT SPECIFICATION

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(54) CONTAINER MADE OF THERMOPLASTICS MATERIAL
 AND METHOD OF MANUFACTURING SAME

- (71) We, GATRUN ANSTALT, a Body Corporate, organised and existing under the laws of Liechtenstein, of Städtle 35, 9490 Vaduz, Liechtenstein, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 10 The present invention relates to a container, such as a bottle, made of a thermoplastics material comprising a side wall, a first end wall integral with said side wall, a second end wall or bottom hermetically
- 15 closing a filling opening defined by the container opposite the first end wall, and means for forming a dispensing opening in the first end wall.
- The invention also relates to a method
- 20 of making such a container.
- This type of container is described for example in French Patents 1 196 104 and 1 274 576. In the case of the known container, the first end wall is provided with a
- 25 groove closed on itself and constituting a line of least resistance, along which an opening may be cut, for example with the aid of a knife, through which the contents of the container may be dispensed.
- 30 The drawback of these containers is that they require a sharp object to open them and that the contents of the container sometimes squirt out when the end wall is cut.
- It is also known by French Patent
- 35 1 196 104 to firstly make the side wall of the container so as to leave on the end wall side an annular portion defining the end opening, to close said opening by a lid and to provide the other end of said wall
- 40 with a bottom after having previously filled said container.
- It is also generally known to cover the dispensing opening of a container with a metal sheet or disc, e.g. aluminium foil,
- 45 provided with a layer of glue, preferably thermo-adhesive, and to weld or crimp said foil on the edge of the dispensing opening (cf. for example French Patent 1 273 581).
- It has been ascertained that the seal of a
- 50 metal foil on the edge of the dispensing opening is not very convenient especially when said edge is inside the periphery defined by the corresponding end of the side wall of the container. This drawback is
- 55 further increased when the side wall and the end wall are made by heat-forming and when the subsequent dispensing opening is cut out from said end wall by suitable cutting, shearing or stamping means.
- 60 In fact, in this case, the thickness of the end wall is substantially less than that of the side wall, with the result that the dispensing opening made in said end wall is delimited by a very sharp edge which makes
- 65 the use of these containers difficult. In addition, in the case of a thin edge located inside the periphery of the corresponding end of the side wall of the container, the seal to be made between said edge and the
- 70 metal foil by cold-gluing or by heat-sealing is often defective, with the result that the contents of the receptacle is in direct contact with the ambient air and may even escape inopportunistly. Upon sealing of the
- 75 metal foil on the already thermo-formed edge of the container, the heat from sealing releases the internal tensions of the thermoplastic material which are due to the thermo-forming and to the sharp cooling
- 80 of the thermoplastic material when it comes into contact with the mould, with the result that the edge retracts and cracks in the sealing zone.
- It is an object of the present invention
- 85 to eliminate or substantially mitigate these drawbacks by proposing a container of the type mentioned in the opening paragraph which container has at least one dispensing opening provided with a covering foil or
- 90

cap hermetically closing said container before it is used.

According to the present invention there is provided a container comprising a side wall made of a thermoplastics material, a first end wall made of a thermoplastics material and integral with the side wall, a second end wall or bottom hermetically closing a filling opening defined in the container opposing the first end wall, the first end wall defining a curved or polygonal through-slot which is at least partially closed on itself and formed by melting of the thermoplastics material, and the first end wall being provided at least partially with a covering hermetically sealed over the parts of the first end wall surrounding and surrounded by the slot whereby a dispensing opening delimited by the slot can be provided by removing at least a part of the covering and pulling the latter to move the part of the first end wall surrounded by the slot away from the surface of the rest of said wall.

25 The slot delimiting the dispensing opening has rounded edges since, when the slot is made by melting the thermoplastic material, said latter tends to contact so as to form rounded edges. In addition, since 30 that part of the first end wall surrounded by the slot remains sealed to the covering, said dispensing opening may be easily closed again, after the container by returning said part of the first end wall part to its initial position.

The present invention also provides a method of manufacturing and filling a container, said method comprising the steps of: depositing on the bottom of a mould a covering; injection moulding or thermoforming a thermoplastics material in the mould to form integrally a side wall and a first end wall of the container, the end wall being hermetically sealed to the covering during said moulding or forming operation; forming at least one curved or polygonal through-slot, at least partially closed on itself, in the end wall by melting the thermoplastics material, the covering being hermetically sealed over parts of the end wall surrounding and surrounded by the slot; filling the receptacle through a filling opening defined by the container opposite the end wall; a hermetically closing said filling opening by means of a second end wall or bottom; whereby a dispensing opening delimited by the slot can be provided by removing at least a part of the covering and pulling the latter to move the part of the first end wall surrounded by the slot away from the surface of the rest of said wall.

In this method a sealed contact is made between the covering and the first end wall when the container is moulded and before 65 the slot is made in said first end wall.

In addition, as the first end wall is already fast with the covering, the parts of said wall defining the slot do not undergo any deformation during the production of the latter by melting of the thermoplastic material; furthermore, the excess heat with respect to that necessary for melting the slot which could soften the thermoplastic material in said parts of the wall is rapidly distributed and dissipated particularly if 75 the covering is made of metal foil.

The invention will be more readily understood on reading the following description with reference to the accompanying drawings, in which: 80

Figs. 1 to 5 are vertical axial sections through a container during the different stages of its manufacture and filling;

Fig. 6 is a vertical axial section through a container filled and closed according to the invention; 85

Figs. 7 to 10 are views in perspective of different embodiments of the extraction end of the container according to the invention; and 90

Figs. 11 to 13 are axial sections through further embodiments of the extraction end of the container according to the invention.

Referring now to the drawings, Figs. 1 to 6 show a mould 1 having a cavity 2 of suitable form, for example in the form of a cylindrical, truncated or pyramidal bottle or beaker in which is disposed, on the bottom 1a of said mould, a metal foil or covering 3, preferably made of aluminium 100 which, on the face opposite the opening of the mould 1 is provided with a layer of adhesive which glues hot or cold.

This covering 3 may be in the form of a cap with a raised edge, but it may also be almost flat as shown in Fig. 7. The covering 3 comprises a tongue 3a which is not covered with any layer of glue or adhesive. 105

After having deposited the covering 3 in the mould 1, the end wall 4a and the side wall 4b of a container 4 are moulded above said foil 3, for example by a well known method of thermo-forming from a thermoplastics strip or sheet, such as for example described in French Patent 1 134 142 or 115 German Patent 1 165 241. The upper part of the side wall 4b terminates in an outwardly directed annular edge 4c surrounding an opening 4d for filling. Of course, a known method of injection moulding (or thermoforming) may also be carried out to make the container 4. When the end wall 4a is moulded, it comes into contact, in the hot state, with the adhesive layer, which is preferably heat-sealing, provided on the 125 inner face of the covering foil 3 with the exception of the portion forming tongue 3a which, moreover, automatically fits into the material of the side wall 4b in the same way as the raised edge 3b of the foil 3 if 130

there is one (cf. for example Fig. 2). Under the effect of the uniform pressure prevailing inside the container 4 and more precisely, on the side of the inner face of the end wall 4a and of the side wall 4b, and under the effect of the heat of the thermoplastics material coming in contact with said covering foil 3, the layer of adhesive establishes, after the whole has cooled down, a sealed, sufficiently solid bond between said foil 3 and said end wall 4a.

Once this sealed bond is established, a through slot 5 of curved or polygonal form, closed at least partially on itself (cf. for example Fig. 10) is made in the end wall 4a. This slot 5 is made in the end wall 4a by melting the thermoplastic material composing same with the aid of a heated electrode 18 of suitable form, for example annular, and arranged so as to be able to penetrate into the mould 1 as far as the bottom thereof. As the covering 3 is made of a non-fusible material, for example paper but preferably metal, particularly aluminium, the heated electrode 18 has no effect on said foil 3 and is stopped thereby since said latter rests directly on the bottom 1a or another portion of the mould 1 made of an incompressible material. When the thermoplastics material is melted at the moment of making the slot 5, this material escapes laterally, forming a sort of flange or rib 6 of rounded section (cf. in particular Fig. 11) on each edge defining the slot 5. The slot 5 can be of round, oval, or polygonal shape and closes at least partially on itself (cf. Fig. 10). When the slot 5 does not close entirely on itself, it is important that the joining part 7 which is integral with the end wall 4a and which connects the part defined by the outer edge 5a of said slot 5 to the part delimited by the inner edge 5b of this slot, extend along a straight line or be at least relatively short (cf. Figs. 10 and 11). The slot 5 may also be entirely closed on itself (cf. Figs. 1 to 9, 12 and 13) with the result that the part 4a' of the end wall 4a, delimited by the inner edge 5b of the slot, is entirely separated from part 4a'' of the end wall 4a, said part 4a'' located outside the edge 5a of the slot 5.

The part 4a' of the end wall 4a, part 4a' being located inside the slot 5 and entirely separated thereby from the part 4a'' located outside the said slot 5, is maintained in place by the covering 3 which is hermetically sealed by adhesive or welding both on the outer part 4a' and on the inner part 4a' of the end wall 4a. For making the slot 5, the container is not necessarily housed in the mould 1 having served for forming said container 4. In fact, for making the slot 5, it is sufficient if that container part, i.e. the end wall 4a, which is provided with the covering foil 3 is sup-

ported by a support 8 which may possibly also hold the container 4 laterally, as shown in Fig. 3.

After the slot 5 has been made, the container 4 is transported to a filling station where it is filled from one or more nozzles 9 through the filling opening 4d (Fig. 4) and said container 4 is then closed, for example in a sealing station where it is provided with a sectioned or flat, separate bottom 10 hermetically welded on the annular edge 4c of the container 4 (cf. Fig. 5). Whilst the container 4 is being filled and sealed, it rests on a support plate 11. In the sealing station, a support ring 12 and electrode 13, which are vertically movable and capable of tightening therebetween the edges of the container 4 and the separate bottom 10, serve to hermetically close, in known manner, the container 4 which is then placed in its normal position in which the covering foil 3 is located above the separate bottom 10 (Fig. 6).

Fig. 7 shows that the outer edge 5a of the slot constitutes at the same time the delimitation of the extraction opening 13 of the receptacle once the covering foil 3 has been removed. This extraction opening may also be shaped so as to present a semi-circular part 13a followed by a part 13b having the contour of a pouring lip after the covering foil 3 has been removed (cf. Fig. 8).

It is not necessary for the covering 3 to cover the whole of the end wall 4a. It may for example take the form of a strip (cf. Fig. 9) which covers only a part of the end wall 4a provided in the covered zone with two slots of which the outer edges 5a constitute the extraction opening after the removal of the covering 3 on which adheres the part of the end wall 4a' located inside the slot 5, i.e. inside the outer edge 5a.

Of course, when the mould 1 has a flat bottom and the covering 3 does not cover the whole of the end wall 4a, said covering 3 fits into said wall 4a (Fig. 9) which then presents a shallow recess 14, after said covering 3 has been removed. Similarly, the tongue 3a of the covering 3 fits into the adjacent part of the side wall 4b forming a recess 15 therein, but with the difference with respect to the covering 3, that said tongue 3a does not adhere to the side wall 4b of the container.

It is easily understood that the end wall 4a may be provided with a plurality of extraction openings in the zone of the covering 3. This may be advantageous when the container 4 contains a powdery or granular product or pieces in bulk, etc.. In this case, it may also be advantageous to provide the inner face of the covering 3 with a layer of glue with permanent adhesive power, with the result that, after the recep-

tacle has been used, the covering 3 may be reglued on the end wall 4a.

In the case of the slot 5 not being entirely closed on itself (Figs. 10 and 11), the part 5 4a' of the end wall 4a serves as permanently attached partial cover, the tongue 3a and covering 3 fast therewith facilitating its pivoting at the level of the joining part 7.

When the covering 3 is in the form of a 10 cap, the raised edge thereof forming a cylindrical side wall 3b may be threaded and a flat part 3c may cover the end wall 4a of the container 4. In this case, there is provided on the face of the covering 3 opposite the end wall 4a, a layer of highly 15 viscous glue 16 which is thixotropic in behaviour, has a low shear strength and which, in addition, presents a high volumic stability. In this way, when the threaded 20 cap covering 3 is rotated with respect to the side wall 4b of the container, the sealed bond between the flat part 3c of said cap 3 and the outer part 4a' of the end wall 4a, said outer part 4a' surrounding the slot 5, is broken.

The end wall 4a of the container is not necessarily flat. It may also be convex, spherical, pyramidal, truncated, etc. or may be a combination of a flat part with a non-flat part. Fig. 13 shows a part of a container, which comprises in particular an end wall 4a of frusto-conical shape, the slot 5 being made in the flat portion of 30 same. On its outer face, the truncated face of the conical end wall 4a adheres intimately to the covering 3 which also hermetically covers the slot 5 and is shaped so as to be able to be adapted to the frusto-conical shape of the end wall.

40 WHAT WE CLAIM IS:

1. A container comprising a side wall made of a thermoplastics material, a first end wall made of a thermoplastics material and integral with the side wall, a second 45 end wall or bottom hermetically closing a filling opening defined in the container opposing the first end wall, the first end wall defining a curved or polygonal through-slot which is at least partially closed on itself and formed by melting of the thermoplastics material, and the first end wall being provided at least partially with a covering 50 hermetically sealed over the part of the first end wall surrounding and surrounded by the slot whereby a dispensing opening 55 delimited by the slot can be provided by removing at least a part of the covering and pulling the latter to move the part of the first end wall surrounded by the slot 60 away from the surface of the rest of said wall.

2. A container as claimed in claim 1, wherein said slot has edges of substantially

rounded cross-section.

3. A container as claimed in claim 1 or 65 2, wherein said slot is closed on itself.

4. A container as claimed in any one of claims 1 to 3, wherein the first end wall comprises at least one flat face.

5. A container as claimed in any one of 70 claims 1 to 4, wherein the first end wall comprises at least one non-flat part in which the slot is defined.

6. A container as claimed in any one of claims 1 to 5, wherein the surface area of 75 the covering is less than that of the face formed by the first end wall.

7. A container as claimed in claim 6, wherein the covering is located in a recess in the first end wall. 80

8. A container as claimed in any one of claims 1 to 7, wherein the covering comprises a non-adhesive tongue located in a recess in the side wall of said container.

9. A container as claimed in any one of 85 claims 1 to 8, wherein the covering includes a cylindrical threaded part and a flat end part provided with an adhesive layer.

10. A method of manufacturing and 90 filing a container, said method comprising the steps of: depositing on the bottom of a mould a covering; injection moulding or thermo-forming a thermoplastics material in the mould to form integrally a side wall and a first end wall of the container, the 95 end wall being hermetically sealed to the covering during said moulding or forming operation; forming at least one curved or polygonal through-slot, at least partially closed on itself, in the end wall by melting 100 the thermoplastics material, the covering being hermetically sealed over parts of the end wall surrounding and surrounded by the slot; filling the receptacle through a filling opening defined by the container opposite 105 the end wall; and hermetically closing said filling opening by means of a second end wall or bottom; whereby a dispensing opening delimited by the slot can be provided by removing at least a part of the covering 110 and pulling the latter to move the part of the first end wall surrounded by the slot away from the surface of the rest of said wall.

11. A method substantially as herein- 115 before described and illustrated with reference to the accompanying drawings.

12. A container substantially as herein- before described and illustrated with refer- 120 ence to the accompanying drawings.

MARKS & CLERK,

7th Floor,

Scottish Life House,

Bridge Street,

Manchester, M3 3DP.

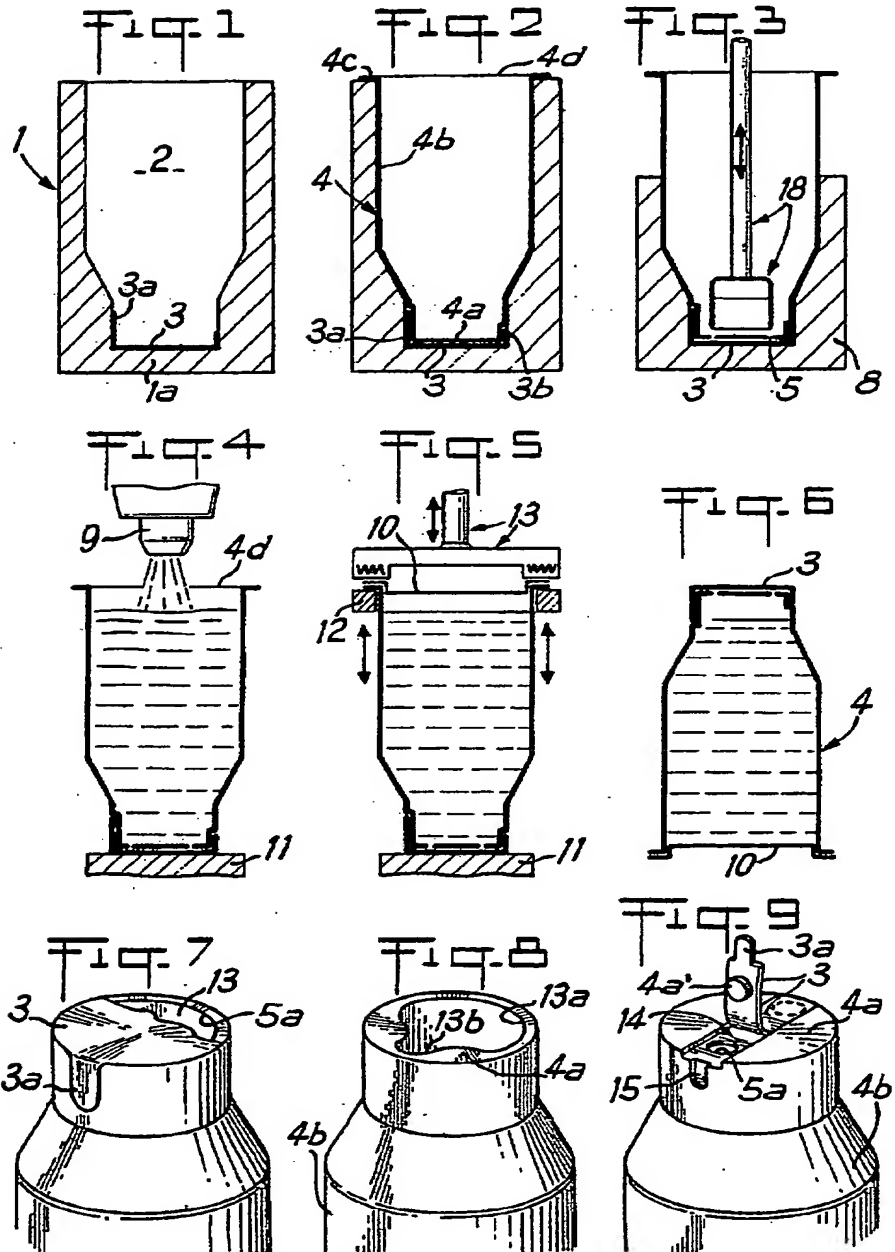
Agents for the Applicants.

1549 018

COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale.
SHEET 1



1 549 018

COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale.

SHEET 2

Fig 10

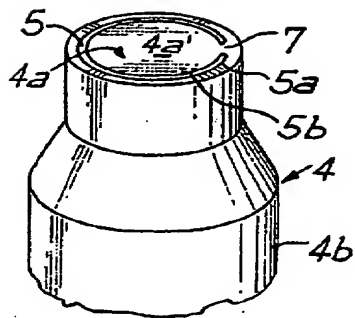


Fig 11

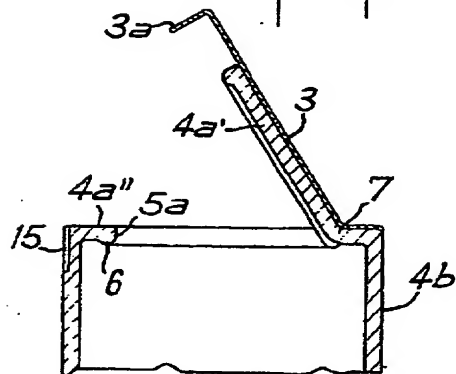


Fig 12

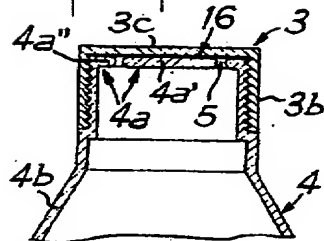


Fig 13

